

REMARKS

This Amendment is responsive to the Office Action mailed on December 10, 2007. Claims 1, 2, 4, 5, 8-14, 16-21, and 23 are amended. Claims 39-42 are cancelled. Claim 43 is new. Claims 1-38 and 43 are pending.

The Examiner has objected to the Abstract as exceeding 150 words in length. The Abstract is amended herein to overcome this objection, withdrawal of which is respectfully requested.

The specification is also amended herein to correct obvious errors in paragraph 67.

Claims 1-14 and 39-42 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 6,728,270 to Meggers in view of U.S. patent no. 6,674,718 to Heddes.

Claims 15-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 7,139,398 to Candelore in view of Heddes.

Claims 21-23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Candelore in view of Heddes and Meggers.

Claims 24-26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Candelore in view of Meggers.

Claims 27-38 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Candelore in view of Meggers and Heddes.

Applicants respectfully traverse these rejections in view of the amended claims and the following comments.

Discussion of Amended Claims

Claim 1 is amended to specify that the deadline is derived from at least one of a pre-existing synchronization time stamp and a pre-existing synchronization time reference extracted from one or more of said packets carried in said plurality of streams.

Claim 4 is amended to specify that the time stamp comprises an MPEG time stamp and the time reference comprises an MPEG program clock reference.

New claim 43 is an independent apparatus claim that corresponds to amended method claim 1.

Support for the amendments to claims 1 and 4 and for new claim 43 may be found, for example, at paragraphs 34-37 of Applicants' specification and in original claim 4.

Claim 5 is amended to depend from claim 1 rather than amended claim 4.

Minor amendments are made to claims 2, 8-14, 16-21, and 23 to improve readability.

Discussion of Rejection of Independent Claim 1

Independent claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Meggers in view of Heddes.

Heddes describes a scheduler applicable to computer networks. This type of scheduler is suited for network switches and routers. In contrast, the present invention as set forth in amended claim 1 describes a scheduler that is designed particularly for video and audio. As set forth in amended claim 1, priority information is extracted by locating pre-existing time stamps and/or time references used for synchronization purposes and which specify when video frames are to be decoded and displayed. For example, the time stamps can be processed in combination with the time reference information to represent deadlines suitable for prioritization. Applicants' claimed concept of prioritization based on video or audio packet delivery deadlines derived from pre-existing synchronization time stamps and/or time references is not disclosed or remotely suggested by Heddes. Rather, the prioritization used by Heddes is solely based on queue fullness levels. The method disclosed in Heddes requires no awareness of data types or data format and is very different from prioritization bases on processing deadlines for video and audio, as is the case with Applicants' amended claim 1.

Further, the Examiner relies on Figure 7 of Heddes for "the examination of queue levels (132, 136 of Figure 7) when moving data into pipes or buffers (7, 8, 9 of Figure 1A)" (Office Action, page 3, emphasis added). It is noted that the reference numerals 7, 8, 9 of Figure 1A correspond to blades containing circuit boards with a network processor and port, and not buffers (see Heddes, Col. 1, lines 41-45). Figure 1A of Heddes appears to describe the prior art and is

unrelated to Figure 7, which describes the details of step 110 of Figure 6A, controlling global fraction, and which indicates that above a certain Q_{max} , the data will be discarded. In addition, Applicants respectfully submit that the Examiner has misconstrued Figure 10 of Heddes as indicating the Examination of the queue levels is used to assign packets to positions in the queues (Office Action, page 3). Rather, Figure 10 of Heddes appears to use a calendar to schedule the packets output from the queues based on priority or packet type, and does not appear to have anything to do with selecting packets for transmission based on whether the buffer has capacity for the packet or not.

The concept of deadlines assignable to real-time traffic such as video, and the value of these deadlines for prioritization is recognized by Meggers. However, in Meggers the priority deadlines are derived by examining Synchronisation Control Packets (SCP) and Admission Control Packets (ACP) that would need to be inserted into the data stream. This is very different from Applicants' claimed solution which uses pre-existing synchronization time stamps and/or time references and does not require the introduction of additional information into the stream. For example, Applicants' claimed invention may use, for prioritization purposes, pre-existing MPEG time stamps and MPEG program clock references (PCRs) which already exist in MPEG transport streams and MPEG program streams for synchronization purposes.

Accordingly, neither Heddes nor Meggers discloses or remotely suggests a priority deadline that is derived from at least one of a pre-existing synchronization time stamp and a pre-existing synchronization time reference extracted from one or more of said packets carried in said plurality of streams, as claimed by Applicants in amended claim 1.

Further, Applicants respectfully submit that one skilled in the art would not have been motivated to combine the disclosures of Heddes and Meggers as suggested by the Examiner. Meggers' disclosure relates to modification of real-time streams, while Heddes relates to a computer networking system. Only with hindsight impermissibly gained from Applicants' disclosure could one of ordinary skill in the art have arrived at the conclusions reached by the Examiner.

Corresponding arguments apply equally to new claim 43, which is an apparatus claim

based on amended claim 1.

Applicants respectfully submit that the present invention would not have been obvious to one skilled in the art based on Meggers in view of Heddes.

Discussion of Rejection of Independent Claim 15

Independent claim 15 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Candelore in view of Heddes.

Candelore describes what is well-known in the industry as “Partial Encryption”. Partial encryption is a method by which key portions of compressed video programs are identified and only these key portions are encrypted (Abstract). Although the remaining segments remain unencrypted, proponents claim that this level of security is sufficient and that the program cannot be reconstructed into any useful form. Applicants respectfully submit that Candelore is far removed from Applicants’ claimed invention.

Candelore’s partial encryption method involves the introduction of additional packets into the communication stream. Hence, references to bandwidth minimization or bandwidth reduction in Candelore refer to the reduced number of inserted packets when compared to the alternative of simulcasting the same stream with a different encryption format assumed for each replication. Candelore’s goal is to achieve compatibility among receivers which support different encryption standards. In contrast, with Applicants’ claimed invention, additional information is not included in the data stream. With Applicants claimed invention as set forth in claim 15, bandwidth efficiency is improved by managing the assignment of programs (streams) carried in digital multiplexes to multiple communication channels. This process is indifferent to the encrypted state of the individual streams. Applicants’ claimed process is unrelated to encryption, and does not remotely resemble the process used or discussed by Candelore. In particular, with Applicants’ claimed invention as set forth in claim 15, programs are assigned (in their entirety) to one of multiple communication channels, and a balanced state is maintained without risk of exceeding the available transmission bandwidth of any particular communication channel. To maintain this balanced state, it may be advantageous at times to reassign one or more programs from a

particular communication channel to another. In order to detect this need for reassignment, data thresholds are set for each communication channel. Thus, with Applicants' claimed invention, reassignment of programs is achieved without disrupting the presentation of the program. Such applications and advantages are neither disclosed nor anticipated by Candelore.

As discussed above in connection with claim 1, Heddes discloses a scheduler applicable to computer networks where prioritization is solely based on queue fullness levels. Heddes does not disclose or remotely suggest reassignment of programs or data streams to different communication channels.

Nether Candelore nor Heddes discloses or remotely suggests the subject matter of Applicants' independent claim 15:

- identifying a first digital multiplex of the plurality of digital multiplexes having a first amount of data that is being transmitted over a first communication channel, where said first amount exceeds a first threshold for said first communication channel;
- identifying a second digital multiplex of said plurality of digital multiplexes having a second amount of data that is being transmitted over a second communication channel, where said second amount does not exceed a second threshold for said second communication channel;
- selecting a subset of said plurality of streams being transmitted over said first digital multiplex; and
- reassigning said subset to said second digital multiplex.

In addition, Applicants respectfully submit that one skilled in the art would not have been motivated to combine the disclosures of Heddes and Candelore as suggested by the Examiner. Candelore relates to partial encryption of television programs for transmission, while Heddes relates to a computer networking system. Only with hindsight impermissibly gained from Applicants' disclosure could one of ordinary skill in the art have arrived at the conclusions reached by the Examiner.

Applicants respectfully submit that the present invention would not have been obvious to

one skilled in the art based on Candelore in view of Heddes.

Discussion of Rejection of Independent Claim 24

Independent claim 24 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Candelore in view of Meggers.

Independent claim 24 sets forth a method of transmitting a plurality of streams of data. In particular, it is determined whether a first subset of data associated with a first stream includes real-time data. Based on a determination that the first subset of data includes real-time data, the first subset of data is classified to distinguish it from a second subset of data associated with a second stream. The first subset of data is then selected for transmission through a first channel rather than through a second channel.

Accordingly, independent claim 24 is directed towards assigning data to a communication channel based on whether the data includes real-time data.

Candelore appears to disclose PID remapping as indicated by the Examiner (Office Action, page 11), but does not disclose or remotely suggest assignment of subsets of data to different communication channels. The PID (Packet ID) identifies the program stream to which a packet belongs. Thus, the PID remapping of Candelore will reassign the packet in question to a different program stream. However, PID remapping is not equivalent to assigning a subset of data to a first or a second communication channel as apparently assumed by the Examiner.

Candelore does not disclose or remotely suggest assignment (or reassignment) of data to different communication channels based on whether the data contains real-time data, as acknowledged by the Examiner.

As discussed above, while Meggers does disclose prioritization of real-time data, in Meggers the priority deadlines are derived by examining Synchronisation Control Packets (SCP) and Admission Control Packets (ACP) that would need to be inserted into the data stream. This is very different from Applicants' claimed solution as set forth in claim 24 which analyzes a subset of data to determine if it contains real-time data and if so, assigning that subset for transmission through a first channel rather than through a second channel.

Further, Applicants respectfully submit that one skilled in the art would not have been motivated to combine the disclosures of Meggers and Candelore as suggested by the Examiner. Meggers' disclosure relates to modification of real-time streams, while Candelore relates to partial encryption of television programs for transmission. Only with hindsight impermissibly gained from Applicants' disclosure could one of ordinary skill in the art have arrived at the conclusions reached by the Examiner

Applicants respectfully submit that the present invention would not have been obvious to one skilled in the art based on Candelore in view of Meggers.

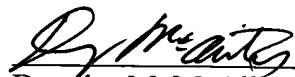
Further remarks regarding the asserted relationship between Applicants' claims and the prior art are not deemed necessary, in view of the amended claims and the foregoing discussion. Applicants' silence as to any of the Examiner's comments is not indicative of an acquiescence to the stated grounds of rejection.

Withdrawal of the rejections under 35 U.S.C. § 103(a) is therefore respectfully requested.

Conclusion

The Examiner is respectfully requested to reconsider this application, allow each of the pending claims and to pass this application on to an early issue. If there are any remaining issues that need to be addressed in order to place this application into condition for allowance, the Examiner is requested to telephone Applicants' undersigned attorney.

Respectfully submitted,



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